FC Business Intelligence

The New Credit Crisis:

How Credit Risk Analytics Professionals are Managing Critical Changes to their Business

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Introduction

'Big Data' just keeps on getting bigger. Regulations rarely seem to sit still. Many economies around the world are only just stuttering out of recession. New technology continues to develop at an astounding pace – and of course, the competition never sleeps.

The challenges facing financial institutions as they develop their credit risk analytics are many, and often contradictory.

Bigger data, coming from a far greater number of sources, needs to be squeezed into fewer – and more fluid – risk models. Analysis needs to be both more accurate and faster in order to make the customer experience as painless as possible, while making sure new regulations are complied with throughout large, complex institutions.

Just how have today's credit risk analytics professionals been coping with the realities of the modern world? And how do they see the industry progressing?

Here, we spoke to three industry leaders from three organizations – Citigroup, SunTrust Banks and Kabbage – to find out what the big drivers are for their organization, how they are facing up to today's challenges, and how they see credit risk analytics evolving to keep up with those challenges and become more effective.

Sundeep Kumar is Senior Vice President, Global Credit Risk at Citigroup, where he has worked since joining the company in November 2010. Previous to this he worked at Merrill Lynch, where he was responsible for the management of risk and equity derivatives trading. Sundeep holds a Master's Degree in Computer Science and Electrical Engineering, along with an MBA in Finance from the Stern School of Business at NYU.

Dev Strischek is Senior Vice President & Senior Credit Policy Officer at SunTrust Banks, where he has worked since 1998, when he joined as a credit approval officer. Dev is responsible for credit policies for SunTrust's wholesale lines of business. Dev holds an MBA from the University of Hawaii, and an undergraduate degree in Marketing from Ohio State University.

Bruce Brenkus is Chief Risk Officer at Kabbage, an online financing corporation based in Atlanta, Georgia that was founded in 2009 and provides working capital to small businesses. Bruce can boast over 28 years of experience working for a range of companies in risk management and financial services analytics. Bruce has an undergraduate degree in Statistics / Economics and also holds a CMB with mortgage industry specialisation.

What is driving change to your credit risk analytics systems within your business?

Bruce Brenkus: The biggest driver is automation, speed of delivery. We want to be different in small business lending by being able to gain as much information as possible in a very short period, and provide a final decision back. We usually guarantee seven minutes online.

It's a balancing act. We need as much data as I can get to make a proper decision, but we really want to turn this around in a quick process. We want to have a web experience that doesn't scare people, so we don't lose people in the funnel process, but still gain the information we need. We build a lot of automation for the normal PII data – name, address, social data, date of birth etc., to get the process started with proper consents, and then we start pulling data in the background. It's very important for us that we tell our customers and lead them down the right path. We need one revenue (sales) channel such as Amazon, eBay, or Merchant Processors, we need one payment channel such as PayPal or Business Checking account, and with the small business principal's consent, we pull the principal's credit report and other sources such as business credit report.

Once the consent is provided, we go back and build the aggregations while we're still gaining more information to make a competent decision. So it's a balancing act – speed of delivery is most important for us from a business point of view, but in terms of risk it's the quality & quantity of data received in that time frame.

Dev Strischek: It's always been a combination of regulatory advice and suggestions. In 1999/2000 I was part of a task force that was assembled to move us to a two-dimensional risk ratings system in preparation for Basel. We were an opt-in bank, and we decided early on that we wanted to go to Probability of default and Loss given default, and the thrust of that was that we would be able to price our loans more precisely, that we would be able to price them more competitively on creditworthy customers and price up for less creditworthy customers.

Our risk rating is tied to our pricing models, and I think the result of that has been generally positive – more so now than ten or fifteen years ago, there's a better correlation between the pricing charged and the degree of risk as measured by our risk rating system.

Sundeep Kumar: I'm primarily responsible for our commercial banking business, and in commercial banking we have a large number of different types of clientele, from small and medium to large companies, individuals, buyers and their suppliers. Initially we had a separate model for each one of these segments, so you had score carding in one, different ways of getting

risk ratings and different analytics, and what we find is that very often there is not one model which can fit everyone. Someone could be in one or two segments at the same time.

Because of that, the analytics needs to understand what the particular situation is for the individual: for example that person might be the CEO of a company, and at the same time the company might be a small-to-medium. So we need to take this into account with the analytics, and we are taking that into account now. We also need to take into account not only the company itself but its entire structure – it might be a group with a large number of subsidiaries – plus it buyers and suppliers. So that is really changing the way we're looking at risk analytics within our business.

What are the main challenges that you are facing in relation to credit risk analytics?

Dev Strischek: Clearly what has emerged for many banks is the accuracy of our data. It falls into either obvious mistakes made, or finding out that the data is simply wrong. To some degree one explanation is that when we first set up our risk rating system we relied heavily on Standard & Poor's and Moody's data, for example, to build up the PD. Of course the seven years has run and the good news is that great recession gave us a large number of bads. Oddly enough in some of our portfolios for example municipalities, there are almost no bads, and so our efforts to be able to validate the model for municipal lending as an example still goes on because we simply don't have enough good and bads to be able to make a statistically valid judgment.

But clearly the loan data is challenging. Everything from purpose codes to collateral codes, there are so many pieces of data on a given loan. For example, as an effort to provide more commercial real estate data, the sheer increase in the number of fields needed to recognize on our system a piece of commercial real estate collateral has gone from ten items to nearly a hundred. You know when you increase the number of input items, that there are going to be mistakes made. A parcel number for example could be alpha-numeric. And when you get past eight or nine characters, somebody is going to make an error. To some degree you simply cannot remove totally the manual input issue. If the data is wrong then the results are inevitably going to be wrong.

Bruce Brenkus: We started out with eBay and Amazon – pretty controlled data so it's easy to go with our interfaces into PayPal, Amazon, and to eBay to obtain all that data so we have it available. As we expand more to brick and mortar stores, there are different data streams such as business checking account and general ledger systems we gain vital information from. This part of the aggregation process has a lot of data but I think much of what we gain from the business checking account on a daily basis: debits, credits, and raw transactions. It is a lot of data, but provides substantial return for us.

The main challenges for us are that we want more and more data. It's a twofold challenge: how do we get those on the front, and number two is that we do a lot of data training and data testing to understand whether that data is going to be worthwhile, and provide improvement in our credit models and credit processes. It's almost reverse engineering.

We'll take a large number of data sources, overlay it with thousands of records that we have performance data on to analyze using various analytic and advance analytic techniques to answer the following question: does it provide merit and improvements over current state? We first ensure that on

the front end if we can gain that data in a fast timeframe and with a high hit rate. It's no good to us if it's great data but we only gain for ten out of a hundred people.

Sundeep Kumar: One of the main challenges is in the amount of data which we are getting – there is a large amount data overload, so we are coming up with a mechanism in-house to analyze this data, whether that means technological changes, or whether it also needs a new way of looking at the process – how we collect the data. So we are looking at different big data mechanisms to do fraud analysis in order to further define our analytics.

The other challenge we are facing is the continuous regulatory requirements. Not only do we have to have the data available, but the data is not only risk – we also have to marry it with our finance data. So it becomes a challenge to basically maintain a single 'golden copy' in order to make sure we are looking at the same analytics company-wide.

What strategy has been put in place in your organization to improve credit risk analytics capabilities?

Sundeep Kumar: One of the things we are looking at is defining the process – we have redefined how our data is structured. A data 'center of excellence' has been established, which looks at the data elements required for the analytics and how that is related to the other analytics that are required. There is also a big drive to look at metadata, so that we can easily configure our systems so that we don't have to, every time that the analytics are redefined, go and redefine everything else.

Dev Strischek: Interestingly enough, and all banks in the US are going through this, our operational risk group has expanded rapidly in both size and scope. We laugh about it, but we have checkers checking the checkers. My job in policy is to say this is how we should be doing things. They're the people checking to see if people are actually executing as expected, or as required. Again, this is a phenomenon not unique to our bank but for all of the major banks in the country. It's not only designed to improve credit analytics, it's designed to improve all phases of the bank. The strategy is simply to do it right, do it correctly the first time around. It seems sort of simple, but it is a massive undertaking.

Bruce Brenkus: There's a few things, but I'll give you the one that I emphasize over and over: 'CANI' – Continuous and Never-Ending Improvement.

A lot of people say they utilize big data, but we actually live big data. The average customer we have has provided six different sources of data, so we may have Amazon, eBay, PayPal, business checking accounts, shipping data, social media, and other online sales channels – I could keep on going. We also have other sources that we may grab, such as the principal's consumer and business credit reports. And then there are other data attributes we gain such as online sales channel ratings and reviews, Yelp ratings, and the Better Business Bureau to help understand the character of the business based on the reviews.

In what ways are you changing your systems and services to comply with regulation and to meet industry standards?

Bruce Brenkus: One word – proactive. Our current business, merchant cash advances, is not really heavily regulated. So we don't have to do much, but we knew we were going to move into more a standard loan, which we are now transitioning. The answer is we've already built a compliance process, reports, and compliance manual for working with bank partners for loans and other products. We make sure that the system fits, that we are compliant with the Bank Secrecy Act, anti-money laundering, things of that nature.

Dev Strischek: It's an extension of the ops risk, but clearly we've gone through a period of two or three years in which all of the policies in the bank – not just credit policies, but ops policies, market risk policies, interest risk policy, compliance, all of these policies – have been articulated in one massive online policy manual. Behind that are the procedures, and the individual lines of business are now responsible for ensuring that all the procedures that have been put into place to carry out the policy are up to date.

Part of ops risk and compliance risk and audit is to ensure that those procedures correctly reflect who is doing what. That has been a massive undertaking. No procedure can exist that is not tied to a policy. And the third line of defense, our audit and risk review, are there to ensure that's exactly what's happening, that the procedures to carry out the policies are valid, up to date and meaningful.

Sundeep Kumar: We are coming up with new mechanisms in order to help us better understand what might be required by the regulators, and sometimes these demands keep on changing. We are trying to make sure that these requirements are not only there to satisfy the regulators but also that we are utilizing them in our day-to-day work.

This has become part of the process within the organization – we are not only getting this to the regulators, but we're also utilizing this in our internal systems so that we can be better in tune with whatever we are sending to the regulators, and also be in compliance with all our capital requirements.

What issues are you facing when you are updating your current systems and processes?

Sundeep Kumar: One of the things is that there are a large number of legacy systems. Our commercial business is in almost 160 countries, and each country has their own processes, their own way of doing things. So our challenge is trying to get a single process which will meet everyone's needs, because otherwise it becomes very difficult to come up with a global policy. We are trying to come up with new processes which take into account the needs of the different countries as well as our different businesses. We support both a private bank and the institutional bank, and the requirements are very different for each of these.

Dev Strischek: The first one would be to make sure that the update works. It's what we refer to as the unintended consequences. You make a minor change to a policy – is it clear? Is it unambiguous? Does it create a loophole, or what we sometimes refer to as 'channel arbitrage'? We make a change in, for example, our home equity mortgage product. Does it come out to be priced more cheaply than it might be in another consumer product? And will that suddenly create a 'leak in the dyke', so to speak, where products that should go elsewhere go through it?

That's just an example, but whenever you make a change in any process, any system, you really have to have a bank-wide group to take a look at it, and we have – and many banks have put them in place – a product risk assessment committee, that takes a look at not only products but changes in systems just to be sure that people from ops risk, market risk, legal credit risk, take a look at it and say 'ok, three don't seem to be any attendant risks or surprises from things we hadn't thought about that are likely to occur.'

Bruce Brenkus: It's great to know that with the amount of data we have that size of data doesn't really matter much with today's technology. I would say the biggest issue would be just making sure that when we're going light speed, that we ensure data protection – that from a credit risk point of view, the data is protected behind firewalls, it's encrypted – we take all precautions around our information and data protection.

Are there results from the changes made to your credit risk analytics practice that are allowing you to prove ROI and increased profitability?

Bruce Brenkus: Yes – a lot of the time you're just looking at the slope & directional from the data to understand what's going on: is the business growing?, is it declining?, is it consistent?. We've done a lot of text mining so that we can see different types of events and calibrate them. We've been able to identify some unique data attributes and trending algorithms, and those have created great merits where we've been able to reduce losses by, for the last six month, approximately 25-30%.

Sundeep Kumar: We have another application which looks at our ROI globally, as well as our remedial. We have a large number of characteristics that we do in terms of remedial management and early warning, so looking at these and collating to the analytics that we have, we do see an improvement. This results in a better quality of our loan portfolio, so there are a lesser number of write-offs – and there is a link between early-warning and remedial. So we do see an improvement in our ROI.

Dev Strischek: I'll go back to our risk rating system – the fact that it does give us a reasonable estimate of the risk premium makes it possible for us to price loans more competitively, and so the immediate impact of that is that we've seen a general improvement in our margins on our lending on the wholesale side that come about from being able to price. This is very challenging any time you're coming out of a recession, the competition being as deep as it is. If I was to point to anything, it would be that we're able to get better margins out of our lending. Particularly for what I'll call our smaller business lending, where it's a little easier to maintain pricing control and standards.

Do you predict significant changes to your credit risk analytics system by the end of 2014?

Sundeep Kumar: There will definitely be a large number of changes. We have come up with certain processes, and now these processes are being vetted by all the countries in order to see whether they agree with what is being proposed. Once we get a buy-in from each of these countries we are going to start implementing these systems and different analytics. So there will definitely be a large number of changes expected globally.

Bruce Brenkus: Yes. The biggest change we expect is that as we continue to expand and continue to segment by product and data sources. Think of it as a tree with different branches. Let's say that you come in, and you're eBay and PayPal. So we move that business over to the branch that utilizes decision rules and models built around this exact set of data streams. And three months from now you add Amazon and your bank account. This business no longer goes through that model – it moves to another branch that has been built on all four of those data streams.

Dev Strischek: I don't know whether I would call them significant, but as we go through the validation process, we're probably going to reduce the number of risk rating models that we have in order to increase the populations that we have for validation in the remaining models. It's significant to the degree that it's more efficient to have fewer models, and you end up with a more statistically valid model – or at least a less statistically invalid model.

Initially we had 20 or 30 models, and we're looking to reduce that to a far lesser number, which means a little quicker risk rating process with less fuss than what we've had to go through. My peers in other banks, they're going through similar processes.

Oddly enough though, I think that the regulatory expectations that we validate the models makes some sense – enough years have gone by that most of us have databanks that are rich enough and large enough that we can get better results, and frankly the better the results on the validation, the sharper we can price accordingly.

What are the next steps that you will take when looking to perfect credit risk analytics in your organization?

Dev Strischek: It will be really much more of the same. You get incremental improvement as you sharpen up the accuracy of the risk ratings, and you do that by again validating the models. I don't see any sudden new vistas opening for us, but what I do see is better execution as the answer. And better execution is what will bring costs down and give us more of a profit margin.

Sundeep Kumar: We are looking at different mechanisms, we are looking at different ways of doing the current way of work. We are moving towards a global model which allows an injection of local content so we will be able to comply with local regulatory requirements.

We are looking at systems, and whether it be vendor systems or the internal systems, we are designing a system in such a way that we can take advantage of all of these. This is primarily the way that we are trying to see how we can take separate sources and incorporate them into our systems by creating a sort of a 'façade'. This is looking at the processes, it is looking at data – we are abstracting things out so that we can have better control over all our technologies, all our analytics as well as all our models.

Bruce Brenkus: We do a lot of data laboratory work. We're always experimenting and saying, 'Ok, we have five or six data sources in these models, so what can we do within those data sources to find improvements, better splits? What other data sources are we looking at in the laboratory to find added value?' And then how do we get customers to add those – are they 'need' or are they 'want' or are they 'must have'? We utilize a lot of machine learning and advanced analytics within this process to help us isolate, combine, and deploy new data sources and data attribute composites.

That helps us figure out what we need, and helps us work with the web design team and our marketing team to go after the right people. So I would go back to the whole Continuous and Never-ending Improvement analysis, and say that the goal is not always to reduce losses. Can I take a discreet customer segment at an estimated loss rate and provide them with a product that they will take at the appropriate price points that is profitable for us and good for them? If the answer is no on both of those then we're not going to do it.

Conclusions

From our conversations with our interviewees, the 'big picture' we get is of a series of challenges in the development of credit risk analytics systems – how to cope with the explosion in data while consolidating the variety of credit risk models each company has been using, at the same time as keeping up to date with new regulations.

The focus seems slightly different for each of our respondents. For Bruce Brenkus at Kabbage – a small business online lender, speed is a priority, while Dev Strischek at SunTrust – a large American bank – spoke of the need to cut out errors and have extra layers of checks in place. For Sundeep Kumar at Citigroup, a vast international organisation, the challenge of standardising, as much as possible, its operations in a vast number of geographies was seen as being a major aim.

The consolidation of a myriad of different risk models was a common theme, however, with a lot of effort going in to lowering the number of models any given application can take – while keeping open the possibility of switching from one to another, should the need arise. Research into these areas is very much ongoing, and seems to be very fluid as technologies and systems improve.

Meanwhile, compliance with regulations – and keeping staff in a variety of geographies up to date with that compliance – is another major issue, which needs to be reconciled with more effective risk analysis as institutions evolve.

Yet despite the seemingly gargantuan challenges of new regulations, big data and the increasing complexity of systems designed to handle that data, the outlook from all three of our respondents here remained positive. The ongoing development or risk models does seem to be improving efficiency and accuracy – ultimately allowing for better pricing, at the same time as maintaining a seamless customer experience.